

the body becomes incandescent." Both Prof. Armstrong and Dr. Welsbach attribute the importance of the special composition of the mantle to this particular mixture forming a solid solution of a dilution favourable to the occurrence of the oscillatory changes.

We have endeavoured to put forward a summary, of necessity brief, of some of the principal theories which have been advanced to account for the luminosity of the mantle. Although it is true that some of these theories, if regarded as individually sufficient to account for the phenomena, lead to conclusions mutually inconsistent, yet there is no reason why they should not all contain some part of the truth, unless the experiments of Messrs. White, Russell and Traver be considered as sufficiently conclusive against the idea of the mantle being hotter than the flame. Such a result does not preclude the possibility of catalytic action, for the additional energy thereby developed may be all dissipated in luminous radiations. It seems that the most satisfactory explanation that the present experimental data justify is that the high luminosity is due to a combination of the good radiating power, the high temperature and the selective emissivity of the mantle. The first accounts for the high candle-power at the temperature attained; the second, which is due partly to the selective emissivity diminishing the useless radiation losses and partly, no doubt, to the catalytic action of the ceria molecules, is responsible for the high luminous efficiency of the light, so far as this is a function of the temperature; whilst the third, most probably due to the recurrent chemical changes, accounts for the high luminous efficiency so far as it is a function of the material. Thus all these causes, operating together and assisting one another, combine to produce one of the most efficient artificial illuminants that the ingenuity of man has devised.

MAURICE SOLOMON.

#### THE EXPLANATION OF A REMARKABLE CASE OF GEOGRAPHICAL DISTRIBUTION AMONG FISHES.

MOST text-books and papers discussing geographical distribution have made much of the range of a genus of small fishes, somewhat resembling trout, the *Galaxias*, commonly described as true fresh-water forms, which have long been known from the extreme south of South America, New Zealand, Tasmania and Southern Australia. The discovery, within the last few years, of a species of the same genus in fresh water near Cape Town, whence it had previously been described as a loach by F. de Castelnau, has added to the interest, and has been adduced as a further argument in support of the former existence of an Antarctic continent. In alluding to this discovery when discussing the distribution of African fresh-water fishes in the introduction to my work "Les Poissons du Bassin du Congo," in 1901, I observed that, contrary to the prevailing notion, all species of *Galaxias* are not confined to fresh water and that the fact of some living both in the sea and in rivers suffices to explain the curious distribution of the genus; pointing out that in all probability these fishes were formerly more widely distributed in the seas south of the tropic of Capricorn and that certain species, adapting themselves entirely to fresh-water life, have become localised at the distant points where they are now known to exist. Although as recently as October last the distinguished American ichthyologist D. S. Jordan wrote (*Science*, xiv. p. 20) "We know nothing of the power of *Galaxias* to survive submergence in salt water, if carried in a marine current," it is an established fact, ascertained some years ago by F. E. Clarke in New Zealand and by R. Vallentin in the Falkland Islands, that *Galaxias attenuatus* lives also in the sea. In New Zealand, it periodically de-

scends to the sea, where it spawns, from January to March, and returns from March to May. In accordance with these marine habits, this species has a much wider range than any of the others, being known from Chili, Patagonia, Tierra del Fuego, the Falkland Islands, New Zealand, Tasmania and Southern Australia.

I now wish to draw attention to a communication made by Captain F. W. Hutton in the last number of the *Transactions of the New Zealand Institute* (xxxiv. p. 198), "On a Marine *Galaxias* from the Auckland Islands." This fish, named *Galaxias bollansi*, was taken out of the mouth of a specimen of *Merganser australis* during the collecting excursion to the southern islands of New Zealand made in January, 1901, by His Excellency the Earl of Ranfurly.

It is hoped that by giving greater publicity to these discoveries, the family *Galaxiidae* will no longer be included among those strictly confined to fresh waters and that students of the geographical distribution of animals will be furnished with a clue to a problem that has so often been discussed on insufficient data. As observed by Jordan (*l.c.*), "all anomalies in distribution cease to be such when the facts necessary to understand them are at our hand."

Of the fresh-water species of *Galaxias*, eight are known from New Zealand and the neighbouring islands, seven from New South Wales, three or four from South Australia, one from West Australia, two from Tasmania, seven from South America, from Chili southwards, and one from the Cape of Good Hope.

G. A. BOULENGER.

#### LOCAL MAGNETIC FOCUS IN HEBRIDES.

IN the course of a recent survey in the Hebrides, Captain A. Mostyn Field, in H.M.S. *Research*, found and examined an area in the entrance of East

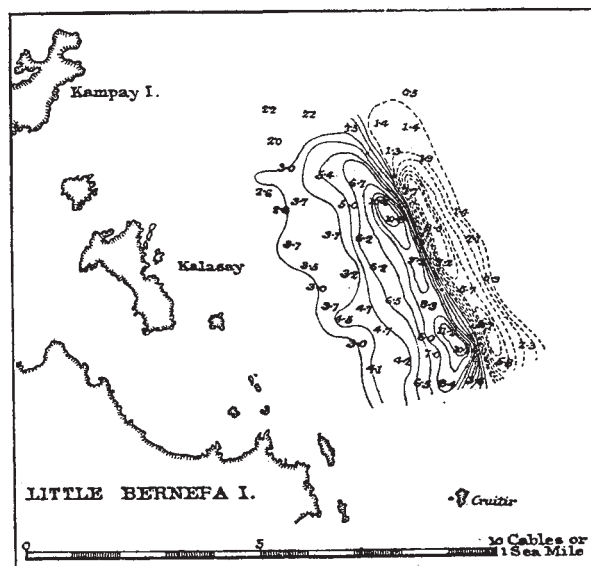


FIG. 1.—Examination in 1902 by H.M.S. *Research* of an area of magnetic disturbance in East Loch Roag, Lewis.

Lines of equal disturbance westerly from the normal declination shown in continuous line.

Lines of equal disturbance easterly from the normal declination shown in broken line.

Normal declination 22° W.

The figures express degrees and decimal parts.

Depth of water over area from 15 to 17 fathoms.

Loch Roag, Lewis, where there is considerable local magnetic disturbance. A plan showing the deviation from the normal declination of the compass needle at

different positions in the area is here given, and will probably be of interest. Unfortunately, no special magnetic instruments were on board, and therefore no observations on the dip or force could be made. It is hoped to complete the observations later. The maximum deviation is  $11^{\circ}$  W.

The remarkable point in this instance is not only the magnitude of the disturbing force, the depth of water and therefore the distance of the compass from the bottom being 100 feet, but that the north point of the needle is repelled from the apparent line of magnetic disturbance, and not attracted towards it as is usually the case in northern latitudes.

W. J. L. WHARTON.

Admiralty, November 15.

### THE NEEDS OF KING'S COLLEGE, LONDON.

A PUBLIC meeting was held on Wednesday, November 19, under the presidency of Lord Selborne, to assist the appeal being made to secure the adequate endowment and equipment of King's College, London. Many men prominent in every department of human learning were present, among whom may be mentioned the Bishops of London and Rochester, Lord Glenesk, Sir A. W. Rücker, F.R.S., Sir John Wolfe Barry, F.R.S., Sir Philip Magnus, Sir W. H. Preece, F.R.S., Mr. A. Siemens, Profs. Jeffrey Bell, W. G. Adams, F.R.S., J. M. Thomson, F.R.S., W. D. Halliburton, F.R.S., W. H. Hudson and D. S. Capper.

The following message from the King was read by the Bishop of London :—

"His Majesty is thoroughly in sympathy with the proposal to raise by subscription a large fund for the endowment of King's College as a constituent of the newly-developed University of London, and wishes the movement for that purpose all success."

The Prime Minister also sent a letter in support of the appeal. He remarked, in the course of the letter, that "It would be a serious misfortune to the interests of higher education in the metropolis if, through the burden of debt and the want of proper endowment, King's College was not able to do its part in the great work which I trust lies before the reconstituted University. Higher education cannot be made self-supporting, and is, nevertheless, one of the greatest of our national needs."

Lord Selborne, in explaining the objects of the meeting, referred in high terms of praise to the work accomplished in the past by King's College in training men adequately to undertake a noble part in the civilisation and humanisation of the world. During the course of his remarks, he referred to the value of science in the following words, which we quote from the *Times* report :—

They were met to try to help King's College to go on in the future preaching the gospel of learning and of work, the gospel of research and applied science on which the real strength of the Empire was built. Was it a great thing that King's College, with its history and distinctive features, should appeal to them for that endowment which was absolutely necessary? That effort was only part of a great movement through which they were passing at this moment. There was a fresh wave of enthusiasm for university teaching sweeping over the land. In London, in the provinces, there were movements for the extension of universities, for the founding of universities, for the development of higher education. Why? He thought it was because there was a general belief that in the university teaching of this country men were taught what they wanted to know by men who knew how to teach. They felt that the higher part of education was not lost sight of in these universities, certainly not in King's College.

It was unanimously resolved, on the motion of Sir R. Jebb,

"That, in view of the distinguished services which have been rendered by King's College to higher education and research in

London, it is of the highest importance that the work of the College, in its new connection with the University of London, should receive support adequate for its effective continuance and progress."

In seconding the resolution, Sir J. W. Barry said :—

It was necessary to bring before all interested in the wellbeing of the University of London the absolute necessity of the cultivation of science and the promotion of research. They knew the story of the exultant professor who said he was investigating a subject which could not be of any use to anybody, and that was why he was so much interested in it. But that was probably only a partial view of that professor, as experience showed that researches which appeared to be of no practical use often turned out to be most valuable adjuncts to human knowledge. What was wanted was not merely to educate workmen in a technical way, but to educate masters and directors. There was no longer a possibility of the great manufactures of this country being conducted successfully without scientific knowledge from top to bottom of the whole of the people engaged.

A resolution proposed by the Bishop of London and seconded by Sir Douglas Fox pledged the meeting to use every effort to raise a sum sufficient to secure "the liberation of the College from debt, the maintenance of the efficiency of the College in laboratories and equipment for higher teaching and research, and the adequate endowment of its professorships."

### NOTES.

It is with deep regret that we announce the death of Sir William Roberts-Austen, K.C.B., F.R.S., on Saturday last, at the age of fifty-nine.

THE Academy of Natural Sciences of Philadelphia has, on the recommendation of its special committee, consisting of Messrs. Theo. D. Rand, Amos P. Brown, R. A. F. Penrose, jun., and H. F. Osborn, has conferred the gold medal of the Hayden memorial geological award for 1902 on Sir Archibald Geikie, F.R.S.

THE trawling vessel s.s. *Huxley*, which has been chartered and fitted out by the Marine Biological Association for service in connection with the International North Sea Investigations, will be alongside Fish Wharf, Billingsgate (by London Bridge) during the afternoon of Tuesday next, December 2. The president of the Association has issued invitations to an inaugural inspection of the vessel to be held on that day.

A NEW building to accommodate the French Academy of Medicine was opened on Tuesday, M. Loubet and M. Chaumié, Minister of Education, being among the guests present. Dr. A. Riche, president of the Academy, gave an address upon the history of the Academy and the contributions made to medical science by its members. "The Academy is happy," he is reported by the *Times* correspondent to have said, "to take possession of a dwelling worthy of France, which it owes to the liberality of the Government of the Republic, and whereby it obtains the means of better serving the interests of the public health."

THE formation of a British committee to take part in the movement for the erection of a memorial statue of the late Prof. Virchow at Berlin was referred to a fortnight ago (p. 35). The inaugural meeting of the committee was held on Friday last, when Lord Lister, who was in the chair, described the origin of the movement and the ready support that has been given to it. A general committee has been formed containing nearly one hundred names of men distinguished by their work in various branches of natural science and medicine; and a form of appeal